

ULTRA THIN BODY FULLY-DEPLETED SOI MOSFETs

Abstract

A method of creating ultra thin body fully-depleted SOI MOSFETs in which the SOI thickness changes with gate-length variations thereby minimizing the threshold voltage variations that are typically caused by SOI thickness and gate-length variations is provided. The method of present invention uses a replacement gate process in which nitrogen is implanted to selectively retard oxidation during formation of a recessed channel. A self-limited chemical oxide removal (COR) processing step can be used to improve the control in the recessed channel step. If the channel is doped, the inventive method is designed such that the thickness of the SOI layer is increased with shorter channel length. If the channel is undoped or counter-doped, the inventive method is designed such that the thickness of the SOI layer is decreased with shorter channel length.